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Pre-flood hazard mitigation plan for the

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Pre-Flood Hazard Mitigation Plan

for the
City of Great Falls
and Cascade County
Montana

August, 1983

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Prepared by the

Department of Natural Resources and Conservation
Floodplain Management Section

In Cooperation with the
City of Great Falls and
Cascade County

INTRODUCTION

Purpose

The purposes of this Pre-Flood Hazard Mitigation Plan are:

- a. to identify general flood hazards in the community,
- b. to describe existing efforts to reduce flood damages in identified areas,
- c. to guide local community officials in taking further action as may be reasonably expected to enhance mitigation efforts,
- d. to identify and support applications for financial assistance to implement ideas and suggestions consistent with community objectives which will reduce flood damages.

Scope

This plan identifies opportunities to reduce future damages from the flooding sources identified in the Great Falls and Cascade County Flood Insurance Studies produced by the Federal Emergency Management Agency (FEMA). This plan takes a comprehensive look at what has already been done to reduce flood damages and develops suggestions of action that can be taken to reduce the physical and monetary effects of future floods.

Funding

The funding source for this plan was provided under the State Assistance Program (SAP) grant administered by the Federal Emergency Management Agency (FEMA). The SAP grant allows the Floodplain Management Section of the Department of Natural Resources and Conservation (DNRC) to assist with local community efforts in reducing future flood damage losses.

Authority

Authority for the City of Great Falls and Cascade County to guide future development in flood-prone areas is provided by:

City Ordinance: 17-84

County Resolution Number: 79-7

The Montana Floodplain and Floodway Management Act (MCA 76-5)

The National Flood Insurance Act of 1968

The Flood Disaster Protection Act of 1973

Definitions

The following definitions are offered as a guide toward better understanding the similarities between the concepts discussed in this plan.

Hazard Mitigation - A plan "to alleviate by softening and making less severe the effects of a major disaster or emergency and of future disaster in the affected areas, including reduction or avoidance. Hazard mitigation can reduce the severity of the effects of the flood emergency on people and property by reducing the cause or occurrence of the hazard; reducing exposure to the hazard; or reducing the effects through preparedness, response and recovery measures. Hazard mitigation is a management strategy in which current actions and expenditures to reduce the occurrence or severity of potential flood disasters are balanced with potential losses from future floods."

Floodplain Management - A comprehensive approach "To reduce the damaging effects of floods, preserve and enhance natural values and provide for optimal use of land and water resources within the floodplain. Its goal is to strike a balance between the values obtainable from the use of floodplains and the potential losses to individuals and society arising from such use."

Emergency Preparedness - A process to "reduce the vulnerability of people and communities of this state to damage, injury, and loss of life and property resulting from natural or man-made catastrophes."

Flood - "A general and temporary condition of partial or complete inundation of normally dry land areas from (a) the overflow of streams, rivers, or other inland water bodies, or (b) the unusual and rapid accumulations or runoff of surface waters from any source.

Identification of Flood Problem

Flooding generally occurs in the Great Falls and Cascade County area in May and June as winter snow accumulated in the higher elevations begin to melt. Warming periods, sometimes accompanied by rainfall, cause tributaries to swell rapidly. The resulting flood flows may be localized or basinwide, lasting from a few hours to several days, depending on temperature changes, amount of rainfall, soil moisture content, and soil permeability. Shallow flooding may occur due to high groundwater tables and the impoundment of runoff water in low areas having poor drainage. As urbanization continues, storage capacities are being diminished and more runoff will occur.

History of Flooding

Several major floods have occurred in the Cascade County area (including the City of Great Falls) but none as severe as the flood of June 1964 in Great Falls. Nearly 3,000 persons were evacuated from the flooded areas and 681 homes and 24 business sustained damages. Flood depths from 10 to 12 feet were noted on several homes located in the low-lying areas. As

urbanization has increased in Great Falls over time, more persons are affected from each ensuing flood of large magnitude. Flooding in recent times has occurred in 1908, 1916, 1948, 1953, 1964, and 1975.

Flood Protection Measures

Flood protection measures in the Cascade County area (including the City of Great Falls) appear to be minimal. These consist of the following:

- Bank shaping and rock riprap placement for streambank stabilization.

The City of Great Falls and Cascade County are in the Regular Phase of the National Flood Insurance Program (NFIP) and are enforcing comprehensive flood damage reduction regulations.

Future Flood Protection Measures

The combined City/County have developed plans and are now initiating projects that will reduce or eliminate some flooding problems.

The Sun River Levee is now under construction by the US Army Corps of Engineers (USACE). The levee will afford protection to a large number of homes and businesses that have been flooded as recently as 1975. The levee project is scheduled for completion in the spring of 1984.

Emergency Preparedness

Cascade County's basic emergency preparedness plan has been in place since 1966. The plan addresses all natural hazards. It contains 2-3 page annexes that address specific natural hazards such as flooding and includes such items as traffic patterns and flow, evacuation routes, and the recovery process. Updating of the 1966 plan is now in progress and is scheduled for completion in September 1984.

The updated version of the emergency preparedness plan will reflect recent advances in the area of natural hazard mitigation and how they interface with emergency preparedness activities.

Recommended Mitigation Measures

These recommendations have been developed with assistance from local community officials. They are not required actions. Rather, it is strongly suggested that when achievable, these recommendations be implemented.

Long Term Mitigation Solutions

- a. Increase the public's awareness of flood hazards and correct construction practices. Elevate their knowledge of the flood-prone areas and describe techniques to reduce flood damages to existing structures. Reinforce the purchase of

Federal Flood Insurance as a way of reducing the economic impact of a flood disaster.

- b. Continue to enforce the flood damage reduction regulations for new construction and substantial improvements in flood-prone areas identified on the Flood Insurance Rate Maps (FIRM) and Flood Boundary and Floodway Maps (FLOODWAY) developed by FEMA.

Specific Areas of Concern

City of Great Falls

NFIP Community Number :300010

FIRM Panel Number: 0005C

Effective Date: November 3, 1981

Existing Mitigation

-Flood Damage Reduction Regulations are being enforced.

-The Gibson Reservoir upstream on the Sun River provides a slight reduction in flood peaks.

-The Canyon Ferry Reservoir upstream on the Missouri River located near Helena provides some reduction of peak flood flows.

*Hauser and Holter Reservoirs located below Canyon Ferry Reservoir are power production dams and are insignificant in flood reduction.

Areas of Concern

These areas were identified by community officials:

- City Sewage Treatment Plant and Lift Station (south of the corner of Smelter Avenue and 6th Street NW)
- Storm Water Drainage Outlet Pipe (in the City/County jurisdiction north of the Missouri River on the river frontage road near Black Eagle)
- Water Treatment Plant (west of 13th Street South and 4th Street South)
- Country Club Flooding (on Meadowlark Drive near U.S. Highway 89 bypass)
- Increased flooding downstream of the Sun River levee near the confluence with the Missouri River
- New building on River Drive (west of 8th Avenue South)

Recommended Mitigation Measures

1. City Sewage Treatment Plant and Lift Station

- a. Determine if 100-year flood elevation depicted on FIRM is correct.
- b. The plans for the City Sewage Treatment Plant were developed using city survey datum. The 100-year flood elevation was developed using U.S.G.S datum. To convert the City datum to U.S.G.S. datum add 16.19 feet to the City datum.

The floor level of the treatment plant Administration Building is 3301.83. Add the 16.19 feet conversion equation, equals 3318.02 M.S.L.

The 100-year flood elevation at that site is 3311 M.S.L. giving the treatment plant approximately 7 feet of freeboard protection.

2. Storm Water Drainage Outlet Pipe

- a. Remove debris from drainage area to facilitate adequate outlet flow.
- b. Maintain debris removal and maintenance activities on a predetermined and prescribed basis.

- * Upstream drainage area also needs debris removal and maintenance of waterway and culvert located near 21st and Colorado Avenue in Black Eagle, plus other downstream culvert locations.

3. Water Treatment Plant

- a. Determine if existing protection measures are adequate to protect against the 100-year flood.
- b. If inadequate, determine the feasibility of improving existing protection measures against the 100-year flood.
- c. Develop alternative water supply facilities if the present location is affected by the 100-year flood.

4. Country Club Flooding

- a. With the development of the new flood identification data provided by the USACE after the completion of the Sun River Levee, determine if the Country Club would be susceptible to flooding from the 100-year flood.
- b. If determined to be susceptible, investigate the feasibility of developing a flood protection levee.

- c. Encourage the purchase of adequate flood insurance to protect against the financial impact of a flood.
 - d. Determine the number of sand bags needed to protect the club, purchase and store at the club.
- 5. Increased flooding downstream of the Sun River Levee near the confluence of the Missouri River.
 - a. Determine which new areas would be inundated as a result of the newly completed levee when new flood identification data becomes available.
 - b. Enforce the City's flood damage reduction regulations for the newly identified areas.
 - c. Encourage the purchase of flood insurance for newly included structures.
- 6. New building on River Drive
 - a. Determine if the new structure is in compliance with the city's flood damage reduction regulation.
 - b. If not in compliance, encourage the purchase of flood insurance to adequately cover damages caused by flood.

- c. Encourage the acquisition of sandbags and sand to adequately protect the main entrance way on the north side of the structure.
- d. Develop an evacuation plan for employees and determine the feasibility for removal or elevation of any materials susceptible to flooding.

Specific Areas of Concern

Cascade County

NFIP Community Number: 300008

FIRM Panel Number: 0001-1300

Effective Date: December 8, 1981

Existing Mitigation

- Flood Damage Reduction Regulations are being enforced by the County.
- The Gibson Reservoir upstream on the Sun River provides slight reductions in flood peaks.
- The Canyon Ferry Reservoir upstream on the Missouri River located near Helena provides some reduction of peak flood flows.

*Hauser and Holter Reservoirs located below Canyon Ferry Reservoir are power production dams and are insignificant in flood reduction.

Areas of Concern

These areas were identified by the community officials.

- Bridges on the Smith, Sun, and Missouri Rivers and Sand Coulee Creek
- Schools and homes located in the floodway and floodplain
- County roads and highways that would be affected by flooding
- Flash Flooding on Belt and Sand Coulee Creeks

Recommended Mitigation Measures

These recommendations have been developed as guidance for the local community officials. They are not required actions. Rather, it is strongly suggested that when achievable, these recommendations be implemented.

Long Term Mitigation Solutions:

- a. Increase the public's awareness of the flood hazards and correct construction practices. Elevate their knowledge of the flood-prone areas and describe techniques to reduce flood damages to existing structures. Reinforce the purchase of Federal Flood Insurance as a way of reducing the economic impact of a flood disaster.
- b. Continue to enforce the Flood Damage Reduction regulations for new construction and substantial improvement in flood-prone areas identified on the Flood Insurance Rate Maps (FIRM) and Flood Boundary and Floodway Maps (Floodway) developed by the Federal Emergency Management Agency (FEMA).

Recommended Mitigation Measures

1. Bridges on the Smith, Sun and Missouri rivers and Sand Coulee Creek
 - a. Identify which bridges are inadequate to pass the 100-year flow and prioritize their importance for maintaining travel access.

1. If funding becomes available before the next flood event to rehabilitate or replace the existing bridge to pass the 100-year flood, replace the higher priority bridges.

2. In the post-flood period, replace or rehabilitate the bridges to pass the 100-year flood using available flood disaster assistance funds.

* Culverts that are inadequate to pass flood waters should also be replaced to pass the 100-year flood.

2. Schools and homes located in the floodway and floodplain

- a. Schools located in the floodplain (Russell and Centerville)

1. Develop plan of action to remove books and other susceptible materials out of the flood-prone area. This can be done by actual removal of materials from the flood-prone area or elevate the materials above the 100-year flood elevation.

2. Determine the feasibility of applying floodproofing measures (i.e., water-tight seals, brick window wells) to reduce flood damages.

b. Homes in the floodplain

It could be very expensive to do some structural mitigation measures to these structures.

1. Encourage the purchase of flood insurance by the structure owner to protect against the financial impact of a flood.
2. Encourage the lifting of the home and prepare a pad of fill to elevate the structure in compliance with the County's Flood Damage Reduction Resolution.
3. Encourage commercial structures to develop and provide floodproofing measures (water-tight seals) in compliance with the County's Flood Damage Reduction Resolution.
4. If structure is destroyed by any means (i.e., flood, fire, wind) and is located in the floodway, it should not be allowed to be reconstructed. In the flood fringe, it must be reconstructed in compliance to the County's Flood Damage Reduction Regulations.

3. County roads and highways that would be affected by flooding.
 - a. Determine which roads and highways would be eroded by flood waters making them unusable.
 - b. For those roads that would be eroded, investigate the feasibility of providing riprap or some other floodproofing measures.
 - c. For those roads and highways that would be inundated, cutting off access, determine alternative routes.

4. Flash Flooding on Belt and Sand Coulee Creeks

Belt and Sand Coulee Creeks have histories of producing flash flood type floods. This usually is caused by major thunderstorms in the surrounding mountain areas, draining into a relatively narrow creek channel.

- a. Strictly enforce the Flood Damage Reduction Regulations for these areas.
- b. Encourage the structure owners that are located in the flood-prone areas to purchase federal flood insurance to protect against the financial impact of a flood.

- c. Investigate the feasibility of installing National Oceanic and Atmospheric Administration, National Weather Service Flash Flood Warning Devices on Belt and Sand Coulee creeks.

